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A MAIN BANK APPROACH TO FINANCIAL CONTRACTING

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Abstract

This paper analyzes the costs and benefits of using a Main Bank (MB) as a financial provider. Several banks lend resources to a particular firm but only one monitors and remains responsible to other participants. These inside banks act as fund providers for the project, exchanging roles by the time other projects are considered. We show how, depending on firms quality and the banks skills to monitor, an MB-contract outperforms other arrangements. This type of financial relationship is particularly prominent in the Japanese marketplace, and in spite of recent setbacks, we believe some of its features have the potential to be implemented in other marketplaces.

Keywords:
Main Bank, Corporate Governance, Financial Contract
Jel Classification: D21, G21, G30, G32

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1. INTRODUCTION

In recent years there has been quite a number of papers and several books dealing with the economic analysis and importance of the Japanese corporate groups (*CG*), like the keiretsu or kigyo shudan. In contrast to this, the economic features behind the notion of the Main Bank (*MB*) are not so well known and developed, even though this institution seems to play a pivotal role in the success or failure of the industrial group. Economists working in this area, are particularly keen in the search of explanations and the economic logic behind this institution.

These two institutions, *MB* and *CG*, represent corporate arrangements designed to mitigate informational and incentive problems. In his analysis of corporate grouping in Japan, Hoshi (1994) describes 3 major features linked to the financial services that characterize those groups: (i) members of the group provide debt financing, (ii) hold shares and (iii) supply board members. Aoki (1994b), following a similar approach, describe the *MB* as a system consisting in a nexus of main bank-firm relationships, reciprocal monitoring delegation arrangements among main banks, and linkages between the financial authorities and the banking industry. In our approach we only cover the first two points. We agree the third factor may facilitate the success of the *MB* arrangement, but, nevertheless, we think a good understanding of the first two elements captures the core issues of this institutional arrangement.

Certainly Hoshi's three features can also be found outside Japanese groups. For instance, if we turn our attention to other forms of bank-firm relationships, we see that the German *hausebank* , the Korean *chaebol* or some of the Spanish industrial groups (Corporación Industrial Banesto, BBV, Cooperatives in Mondragón) provide alternative examples in line with those features Hoshi describes.

The *MB* system, however, proves itself quite different from the financial arrangements present in other bank-oriented systems. Under this system, firms and financial intermediaries are tied through a cross-relationship that goes beyond the simple provision of funds: they exchange valuable information concerning the different markets where they are present.

Although, and in line with its importance, there is a growing number of economic papers approaching the main bank issue, we still lack a widely accepted definition of what a main bank means. Moreover, different authors emphasized different aspects of the relation as the key elements. They all agree in one thing though, a *Main Bank Contract (MBC)* is not a legal or formal contract, neither an explicit one. We are dealing here with informal contracts, sustained through reputational effects, and where institutions play a crucial role in terms of facilitating the achievement of better solutions. In such a context, our first goal will be to establish what we understand by a *MBC*. To do so, we use the framework developed by Sheard and Aoki, presenting a relatively simple model that captures, in our opinion, some key elements of the *MB*, not covered before in the economic literature. Unlike Sheard (1994b) we explicitly model a firm. This allows us to ask questions about the optimally of the *MBC* under different types of firm's characteristics. Another important difference is that he views the *MBC* as a delegated monitoring mechanism and compares it with a so-called *normal contract* where each bank monitors different firms, in a non-cooperative basis (therefore getting involved in redundant tasks). Sheard concludes that the first contract is superior to this second one. In our approach, we compare the *MBC* with different types of contracts that are initially superior to the competitive monitoring used by Sheard as a benchmark. On the other hand, Aoki (1994a) emphasizes the analysis of the firm neglecting, in contrast to our analysis, the possible cross-type relationships existent among financial suppliers.
More specifically, we make use of the following characteristics to build up our *MBC* model:

1/ Reciprocal monitoring among banks. That is, we need several relationships to justify that a bank may play the role of a *MB* in some occasions while in others this same bank performs a secondary role and free-rides on another *MB*.

2/ A *MB* bears all the responsibility in front of the other bank participants. But it becomes the residual claimant in case of financial distress.

3/ The role of a *MB* as monitor does not correspond to its share of ownership or lending share.

Certainly, with the choice of these elements to develop a formal model we miss some of the previously mentioned features but we consider our approach as one more in the process of achieving a better understanding of this important economic institution.

In this setting, our main objective will be to prove, that a *MBC* can be, when certain conditions are met, an optimal financial arrangement to provide funds and monitoring to the maximum number of projects. We identify these conditions in a context where the transfer of some expertise to the firm turns out to be as important as the provision of funds to develop a project. We can expect that new industrial sectors or economies in the early stages of development (Japan in the 60's, or Korea in the 70's) are the natural framework to extensively find this kind of projects to develop. With that goal in mind, we compare the *MBC* with four alternative contracts; the so-called *Exclusive Bank Contract*, the *Syndicated Bank Contract*, the *Cooperative Bank Contract* and finally, the previously mentioned, *Normal Contract.* In all cases the required threshold quality level to finance a project, turns to be higher than the social optimum one. That is, we face an *underinvestment* situation in all scenarios. Nevertheless the *MBC* achieves, under some specific requirements, the lowest threshold. The intuitive explanation is that the *MBC* combines in an optimal way three features: 1/ An exclusive allocation of the financier's property rights to one of the banks (the Main Bank). 2/ An incentive scheme that stimulates the *MB* to carry out an intensive monitoring because of its junior rights in case of failure. 3/ The acquisition of informational spillovers. It is important to note that the specific conditions needed to achieve these superior results for the *MBC*, are not extraordinary, contrary to what one could think concerning the questionable validity of the *MB* system in our days. We think the key feature becomes to know whether the *MB* really bears the cost of a project failure or not. As a conglomerate financed through a *MB* system grows, and becomes larger, the state cannot afford its failure (too-big-to-fail). Within this logic the state ends up becoming the real bearer of the risks assumed by the firms within these conglomerates. This feature becomes, as the recent setback in South Korea shows, very perverse due to the lack of incentives the *MB* has to implement efficient monitoring actions.

This paper is organized in four sections. The hypothesis of the model are placed in Section 2 while the solution and the main results follow in Section 3. Some discussion and a preliminary empirical evidence is presented in Section 4. The paper ends with some concluding remarks. For convenience the mathematical proofs have placed in an appendix.

2. THE MODEL

We proceed now to design a simple framework that deals with the previously mentioned features, and issues of the *MB*. We first describe the nature and actions of the agents. Later, we characterize the different financial contracts and the timing of the game.
We consider a two-period model with three basic elements: banks, firms and the financial contract which links them. We proceed to describe them separately.

A/ Banks

Financial institutions face two tasks in this model: i/ they lend funds to firms so that they can undertake a two-period project, and ii/ they monitor the development of projects. The intensity of this task is given by the variable y, where $0 \leq y \leq 1$, chosen at the beginning of the initial period before the entrepreneur define his own actions. Behind the term "monitoring", we synthesize diverse activities such as supervision, advisory, knowledge transfer and in general the different types of support actions taken by the lender to achieve an optimal behavior from the entrepreneur. Under this model characterization, such actions are essential to achieve the whole development of the project. That is, we consider that a project has some "potential" quality θ, that can only be reached if a perfect monitoring $(y = 1)$ is implemented. Whenever the monitoring is imperfect, $y < 1$, then, the "working" quality of the project turns out to be $\theta y < \theta$. We assume that all banks have access to the same monitoring technology which is given, for convenience, by a quadratic cost function $\frac{1}{2}my^2$ [1]. Furthermore, we consider $\frac{1}{2}m \leq I$, with I being the required amount to develop the project. Assuming this, we neglect the situation where the perfect monitoring cost, $(\frac{1}{2}m)$, would be higher than the overall funds lent by the bank, situation quite unrealistic.

Finally, the rights and duties of each bank, depend on the type of financial contract linking a firm with the bank, as we describe later in the paper.

B/ Firms

We consider two symmetric firms working in different markets. Each firm wants to develop a two-period project. The previously referred potential project quality, θ, is publicly known and works in the same way for both firms. The development of a project requires a layout I, where we normalize without loss of generality, $I = 2$ [2] (obviously with this convention, the previous $\frac{1}{2}m \leq I$ hypothesis becomes $m \leq 4$). Firms lack financial resources and must arrange a loan of $I = 2$. Firms lack financial resources and must arrange a loan of $I = 2$ [3], with one or several banks to develop a project.

Our firm is an entrepreneurial one, and becomes characterized by its entrepreneur's effort, h $(0 \leq h \leq 1)$. In fact, we abstract from the control issue at this level, and we do not distinguish among the different agents inside the firm. In our model, the entrepreneur selects his effort, h, at the end of the first period, and this choice affects the second-period results. The motivation behind this approach can be explained in the following terms.

1/ "Entrepreneur's effort", h, can be seen as a synthesis of the different efforts present inside the firm. Basically, we consider h to be a training effort to implement the expertise transfer by the lender through its monitoring activity, y.

2/ Efforts inside the firm are chosen by the end of the first period, before the state of nature has revealed to be good or bad, and, after the financial institutions have implemented their monitoring actions, y. The entrepreneur perceives the level of lender's engagement through the variable y, which, remember, determines the "real" quality of the project, θy. Furthermore, this expression, defines the ex-ante probability the project to be in the good state. Once the entrepreneur observes this, he acts accordingly to his own interest.

3/ The entrepreneur's choice comes into effect in the second period, once the state of the project is revealed.

4/ During the initial period, the lender performs its actions to improve the *external* conditions that help the project to be in a good state of nature. According to this approach, an entrepreneur cannot affect these external conditions, and his effort circumscribes to the *internal* domain of the firm. Only after the state of nature is revealed, the project will be isolated from external conditions. This happens in the second period, and it is then, when the action of the entrepreneur plays its role, conditioning the final returns of the project. If the project reveals itself as good, we assume that firm's technology leads to a second-period production X with a probability, h, given by the entrepreneur effort. On the other hand, if the bad state is realized, the expected returns of the project will be zero, independently of h. Furthermore, we assume a liquidation value equal to zero, as there is no returns at the end of the initial period [4].

Additionally, we consider entrepreneur's effort to be observable but not verifiable and, therefore, not contractible ex-ante. Finally, as we have pointed effort h is costly and its disutility is given by a function $C = \frac{1}{2}lh^2$. Furthermore, we assume that all the entrepreneurs, characterized by the parameter l, are of the same type, independently of the market in which they operate.

C/ Financial Contracts

A financial contract is a vector $\{I, \mu\}$, where $I = 2$ is the referred amount of funds to develop the project, and μ is the firm's share on the returns. Funds are supplied at the beginning of period one, but the partition of funds $(\mu,\, 1-\mu)$ is made at the beginning of period two, once the state of the nature has been revealed. At this stage, lenders can liquidate the project or not, and a negotiation between the entrepreneur and the lenders starts. The outcome of this process is a definition of a μ value that will depend on the type of financial contract considered. We distinguish five different scenarios, depending on the existing links among fund providers: Exclusive Bank Contract (*EBC*), Main Bank Contract, Syndicated Bank Contract (*SBC*), Cooperative Bank Contract (*CBC*), Normal Contract (*NC*).

For the first contract, *EBC*, we understand a scenario where each firm's project is financed by a particular financial supplier. For the second scenario, the *MBC*, we assume the following:

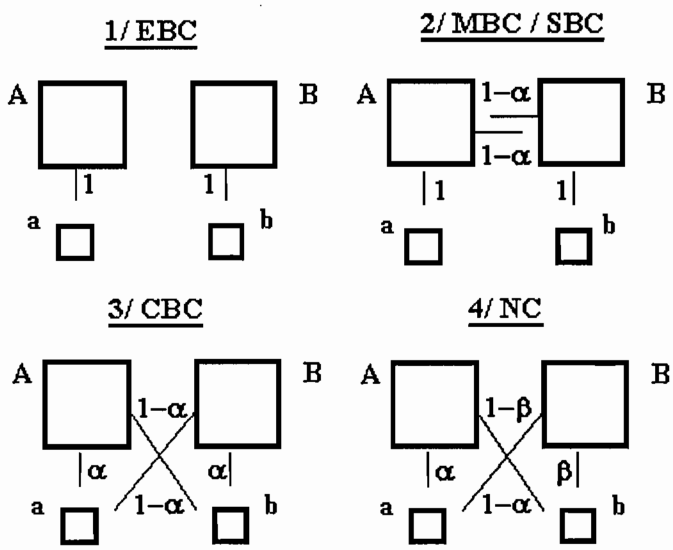
1/ There are two lenders working for each single firm. One of them acts as a MB and lends an amount $I = 2$ to the firm, while borrows from a second bank (SB), a share $(1-\alpha)$ of the total mount. This initial MB behaves as a second bank in an other project.

2/ The SB behaves as a senior lender, and receives a share $(1-\alpha)$ of the project's revenues whenever the return is high enough (that is $\geq 2(1-\alpha)$). If not, the amount of revenues received will be as close as possible to the quantity lent.

3/ Finally, the MB is responsible for monitoring tasks, and pays for its costs.

It is important to note that this cross-relationship, allows to obtain a cooperative solution between banks within a non-cooperative approach. If a *SB* tried to exploit the benefit of its situation in one market, its corresponding *MB* could retaliate in the other market where the deviant acts as a *MB*. This feature prevents the firm to negotiate directly with its *SB* to diminish the bargaining power of the *MB*.

The three remaining contracts are intermediate cases of these two extreme forms. Thus, in the syndicated loan (*SBC*), each bank is responsible for monitoring one project, becoming a *leading bank* ($\equiv LB$) for this project. The *LB* bears all the monitoring costs à la Main Bank, *but* differs from this, because its claims are not junior to other lenders' claims. The fourth type is the Cooperative Contract (*CBC*), where two (or more) institutions cooperate, sharing all the risks and costs in the same proportion of their respective investments' share, α and $1-\alpha$. Finally, the normal contract (*NC*), is the benchmark described in Sheard (1994b). In this financial relationship each creditor defines its monitoring intensity in a non-cooperative basis. This feature, which makes this contract radically different from the previous four ones, will lead to the most inefficient situation in this approach.
The following figure captures the different scenarios described above.



To end this section, we summarize the structure of the game

Timing of the Game

The sequence of actions and events of this game can be described as follows:

1^{st} period			2^{nd} period		
1/	**2/**	**3/**	**4/**	**5/**	**6/**

1/ Facing a 2-period project with a "potential" quality θ, banks provide $I = 2$ funds to a firm through a ST contract.

2/ A particular bank implements a monitoring effort y. This determines, jointly with θ, the state of nature, good or bad, in our terminology.

3/ After observing y, the entrepreneur selects an effort level, h.

4/ At the end of the first period the project reveals itself as good or bad contingent with y and θ. In a bad state the game ends.

5/ In the second period, and if the project is in the good state, a negotiation between the entrepreneur and the banks starts to define how the returns will be shared, μ and $1-\mu$).

6/ The final returns, X, follow with some probability given by entrepreneur's effort, h . Later, this outcome is shared with the proportions μ and $1-\mu$.

3. SOLVING THE MODELS

We proceed now to solve the model and in order to compare the different financial relationships, we obtain the first-best solution to be considered as a benchmark.

3.1. FIRST-BEST SOLUTION

We define the threshold quality level, θ^{FB}, that determines which projects get funds in a first-best scenario will be financed. The social utility function U^{FB}, becomes the following:

$$Max_{\{y,h\}}U^{FB} \equiv \theta yhX - 2 - \frac{1}{2}lh^2 - \frac{1}{2}my^2 \quad (1)$$

This first-best solution is characterized by the fact that all agents' actions can be verifiable. Therefore, the ex-ante financing policy can be made simultaneously

This first-best solution is characterized by the fact that all agents' actions can be verifiable. Therefore, the ex-ante financing policy can be made simultaneously contingent to y and h. This fact is what makes the first-best solution superior to other situation considered where the entrepreneur's effort, h, is not contractible ex-ante.

Solving the problem, we find two cases, depending on the value $\mid l - m \mid$ being higher or lower than four [5].

$$\theta^{FB} = \begin{cases} \frac{1}{X}\{2 + \frac{1}{2}(m+l)\} \quad If \quad \mid l-m \mid \leq 4 \quad (2) \\ \\ \frac{1}{X}\sqrt{\overline{q}(4+\underline{q})} \quad If \quad \mid l-m \mid > 4 \quad (3) \end{cases}$$

Where $\underline{q} = Min\{l, m\}$ and $\overline{q} = Max\{l, m\}$

Direct inspection of the previous expressions reveals that, for small differences between l and m, both parameters will contribute with the same weight to θ^{FB}. This is not so surprising, given the symmetric nature of the first-best problem, where there is a simultaneous choice of efforts. Moreover, each agent implements the highest possible effort ($y = 1$ and $h = 1$). This outcome changes radically when agents' quality becomes quite different ($\mid l - m \mid \geq 4$) [6] . In this case, only the high-quality agent implements the maximum effort, $e_H = 1$, while the low-quality agent free-rides on the other agent, shrinking his effort to a level $e_L = \theta \frac{X}{\overline{q}}$. Furthermore, as equation (3) shows, the low effort implemented by the bad-quality agent has an amplified negative impact in the project's returns, due to the multiplicative functional form of θ^{FB}. In other words, this is a way to show the inconvenience to couple agents with quite different qualities in these scenarios, as the low-quality agent free-rides on the other agent.

After presenting the first-best approach, we proceed to develop the different contracts in detail.

3.2. EXCLUSIVE BANKING CONTRACT

Here there is a cooperative arrangement between banks, and we assume each bank establishes an exclusive relationship with one of the firms considered.

As usual, we solve the game in a backward induction fashion, characterizing first the entrepreneur's problem.
In this scenario, the entrepreneur implements his effort decision, h, once the lender has defined, and the entrepreneur has observed, the monitoring intensity y. Therefore his goal will be to select a value $h = h[y]$ that solves the following maximization problem:

$$\begin{aligned} Max_{\{h\}}\, U^{Ent} &\equiv \mu^{EB}\theta yhX - \frac{1}{2}lh^2 \\ s.t.\ U^{Ent} &\geq 0\,,\ 0 \leq h \leq 1 \quad (4) \end{aligned}$$

Where μ^{EB} denotes the income share he is entitled to, and $1-\mu^{EB}$ is the lender's bargaining power. To determine μ^{EB}, we have to keep in mind that it is defined at the beginning of period two. At that time, independently of the state of the nature, the lender has the power to liquidate the project and obtain a null rent (as $L = 0$). On the other hand, the entrepreneur can withdraw from the firm, and block any return (as h defines the second-period probability of project returns). Both facts make certain that a sequential bargaining between both agents will lead to $\mu^{EB} = 1 - \mu^{EB} = \frac{1}{2}$. Each agent has the same bargaining power, as its participation in the project is required to generate some returns.

Once we have characterized the entrepreneur's effort policy, we use this value and see how the financial institution chooses its monitoring intensity, y, solving:

$$\begin{aligned} Max_{\{y\}}\, U^{EB} &\equiv (1-\mu^{EB})\theta yhX - \frac{1}{2}my^2 - 2 \\ s.t.\ U^{EB} &\geq 0\,,\ 0 \leq y \leq 1 \ \ and\, h = h[y] \qquad (5) \end{aligned}$$

Through the analysis of the different scenarios, it proves quite useful to make use of a corrected value of entrepreneur's effort disutility. By $L \equiv l\frac{(1-\mu)}{\mu}$ we denote the "effective" entrepreneur's effort disutility. That is, we deflate l by the ratio of firm's bargaining power μ to the lender's bargaining power $(1-\mu)$. When this ratio becomes high, the entrepreneur has more incentives than the lender to pursue the success of the project. Therefore, L, is the parameter that describes the entrepreneur's willingness to implement efforts [7]. Consequently, this becomes the "natural" measure to be compared with the m parameter which describes the lender willingness to implement monitoring actions.

Point 2/ in the Appendix shows how to calculate the corresponding threshold-value θ^E:

$$\theta^E = \frac{2}{X}\sqrt{\frac{m+4}{2} Max\{\frac{m+4}{2}, L\}} \quad (6)$$

This expression contains two factors. The first factor, only depends on m, and it is a direct consequence of the sequential ordering of the game. The financial institution implements first its monitoring-incentive effort y, an consequently, an m-dependent factor has to be present. This is so, independently of the "effective" entrepreneur's effort disutility (L) [8]. The second factor balances the monitor's quality, with that of the entrepreneur, being L-dependent when $L > \frac{m+4}{2}$.
Finally and similarly to the first-best solution, both agents implement the maximum effort ($y = h = 1$), when we consider an entrepreneur with enough "effective" quality. That is $L < \frac{m+4}{2}$.

The comparison of θ^E with the first-best solution θ^{FB}, will allow us to define which combinations of agents' expertise will reduce the shortage in project financing.

PROPOSITION 1

We obtain an underinvestment outcome when we compare the EBC with the first-best solution; that is $\theta^E > \theta^{FB}$. This underinvestment becomes larger if the agent who chooses first (the monitoring-lender) is of lower quality than the entrepreneur ($m > L$).

Proof

See the third point in the Appendix.

The level of underinvestment is a natural consequence of our hypothesis of considering effort h observable but not verifiable. It is no longer possible to write complete contracts contingent with h.
Furthermore, we observe an increase in the underinvestment problem when an agent with lower quality makes the first decision (lender). In such situation ($L \leq \frac{m+4}{2}$), the θ^E threshold depends only on m. That is different to the social optimum solution, where the simultaneous choice of y and h lead to a θ^{FB} that balanced l and m. In fact, monitoring intensity in the perfect information framework is $y^{FB} = 1$, but under the *EB* arrangement, for $L < m$, then monitoring is far from perfect, $y^{EB} < 1$.

We proceed now to analyze if we can improve these *EBC* results through the use of a main bank, that is, dealing with the *MBC*.

3.3. MAIN BANK CONTRACT

As it was defined in Section 2, our notion of Main Bank Contract (MBC) follows the description of Sheard (1994b). Thus, we denote with MB^i the Main Bank for project i. This bank provides a proportion α of the necessary funds to finance project i [9] and exchanges $1-\alpha$ with the other bank in order to finance the other project. Recall we consider only two banks in this economy to simplify matters. We assume this $(1-\alpha)$ financing of a project which is placed in a different market, allows the bank to acquire some informational spillovers, while diversifying its investment at the same time. This information is provided by the other Main Bank in exchange for the inside information of its own monitored firm. In fact, in countries like Japan, these meetings where lenders exchange valuable information are quite common and institutionalized. Industries may be different, but they may have some common areas of interests from which the lender may learn or have access to valuable information.

At the time of analyzing possible reductions in the underinvestment problem through the use of the MBC, we note the presence of two different effects. First, there is a direct incentive effect, linked to the junior nature of the MB claims as opposed to the second bank (SB) in case of a project failure. To avoid this unfavorable situation, the MB will monitor more intensively. Besides, there is also a spillover effect, linked to the fact that MB_i [10] can enjoy some advantages acting as a SB_{-i} in the other market. The additional value MB_i obtains from informational spillovers is modeled by multiplying by a factor $\lambda \geq 1$ the rents MB_i obtains as SB_{-i}; that is, λU_{-i}^{SB} [11]. At the end, this additional informational rents will help to diminish the underinvestment problem of MB_i.

In a similar way as we did in the EBC scenario, we can solve the game backwards. First, we have to consider the entrepreneur's maximization problem, which is formally identical to equation (4) but, modifying the sharing of project returns between the entrepreneur and the lender in the adequate way, that is $\mu^{EB} \rightarrow \mu^{MB}$. The key point here is that the bargaining between the entrepreneur and the lender under this MBC becomes symmetric to what we found in the EBC. This is so because each firm only negotiates with its corresponding MB as it happen in an exclusive bank. There is no contact between the SB and the firms. Within such as scheme we can also ensure that $\mu^{MB} = \frac{1}{2}$.
The resolution of the entrepreneur's problem leads to an expression of h as a function of y of the form $h = h[y] = Min\{\frac{\mu^{MB}\theta X y}{l}, 1\}$.
The next stage is to solve the MB problem. Without loss of generality, we focus on Project 1, due to the symmetry of the problem. Using the $h[y]$ expression of

entrepreneur's effort, and keeping in mind what we have stated about informational spillovers, the objective function for MB^1 to define the monitoring intensity y_1 is given by:

$$\begin{aligned} Max_{\{y_1\}}\, U_1^{MB} &\equiv \pi[y_1] - \frac{1}{2}my_1^2 + \lambda U_2^{SB}[y_2]\} \\ s.t.\ U_1^{MB} &\geq 0\, and\ \ h = h[y] \end{aligned}$$

Where $\pi[y]$ denotes the revenues obtained by the MB from the monitored project once a monitoring intensity y is implemented and $h = h[y]$.
$U_2^{SB}[y_2]$ are the returns MB_1 obtains from project 2, once MB_2 implements $y = y_2$ and $h = h[y]$. Those two expressions become:

$$\pi[y_1] = \begin{cases} \alpha(R[y_1] - 2) & If\ \ y_1 \geq \overline{y} \\ R[y_1] - 2 & \underline{y} \leq y_1 < \overline{y} \\ -2\alpha & If\ \ y_1 < \underline{y} \end{cases} \quad U_2^{SB} = \begin{cases} (1-\alpha)(R[y_2] - 2) & If\ \ y_2 \geq \overline{y} \\ 0 \quad If & \underline{y} \leq y_2 < \overline{y} \\ R[y_2] - 2(1-\alpha) & If\ \ y_2 < \underline{y} \end{cases} \tag{8}$$

$$R[y_i] = (1-\mu)\theta Xyh \quad R[\overline{y}] = 2 \quad R[\underline{y}] = 2(1-\alpha)$$

To characterize this problem, we define $\overline{y}$ as the monitoring level for which the project returns are large enough to allow the junior claimant (i.e. MB) to recover its initial investment, 2α. Whenever $\underline{y} \leq y < \overline{y}$, only the senior claimant (i.e. SB), can get back its initial investment $2(1-\alpha)$ completely. Finally, for low levels of monitoring ($y < \underline{y}$), all the returns will be kept by the SB. Moreover, this amount is not enough to recover its initial spending.

In Point 4 of the Appendix, we compute the corresponding θ^M values. We first focus in the situation where the informational spillovers have no value; that is, $\lambda = 1$. Obviously, this is the least favorable framework for the MBC in comparison with other financial arrangements. The MBC investment outcome obtained under this assumption represents therefore the lower bound.

We can distinguish three different situations, considering the proportion of funds α provided by the MB^1 to finance the project 1:

Case 1: High involvement in the financing of project 1.
When α is high enough, more specifically when $\alpha \geq \alpha[m] \equiv \frac{2m}{m+4}$, then the MBC threshold-value, θ^M, coincides with the one obtained under the EBC.
Furthermore, the threshold value $\alpha[m]$ is increasing in m and, therefore, as monitoring expertise rises, MB^1 can reduce its participation in project 1 financing

without losing efficiency with regard to the *EBC.* We suggest, that in a risk-averse framework, any reduction in the level of α will represent a risk-reduction strategy for a *MB*. This is so because it basically performs a role as a *SB*, hedged by the other *MB*.

Case 2: Medium involvement in project 1.
This situation corresponds to values of α in the region $\frac{1}{2}\alpha[m] \leq \alpha < \alpha[m]$. We differentiate the study according to the value of L [12]

For $L > \frac{m+4}{2}$, θ^M coincides, as in the previous case, with the threshold value of the *EBC,* θ^E. It is interesting to point out that the $\frac{m+4}{2}$ value is the total cost (financing and monitoring costs [13]) born by each lender. In the Appendix, we show that as long as the "effective" entrepreneur effort disutility, L, be higher than the former cost, the entrepreneur could implement an "imperfect" effort $h = \sqrt{\frac{(m+4)/2}{L}} < 1$. This fact, as we are going to see later, is common to all financial arrangements, and enhances a perfect monitoring behavior from the financial institution, to minimize the returns lost due to this entrepreneur behavior.
Regarding the $L < \frac{m+4}{2}$ region, we obtain an underinvestment situation independently of the L value (see point 5 in the Appendix). In particular :

$$\theta^M = \begin{cases} \frac{2}{X}\sqrt{\frac{m}{\alpha}}\sqrt{\frac{4}{(2-\alpha)}} \quad If \ L < \frac{4}{(2-\alpha)} \\ \\ \frac{2}{X}\sqrt{\frac{m}{\alpha}}\frac{L}{\sqrt{2L-4}} \quad If \ \frac{4}{(2-\alpha)} \leq L < \frac{m+4}{2} \end{cases} \tag{9}$$

Case 3: Low engagement in project 1 financing
When $\alpha < \frac{1}{2}\alpha[m]$, there is an underinvestment independently of L. The threshold values are the same as the previous case, but for a low-quality entrepreneur
$(L \geq \frac{2}{(1-\alpha)})$ [14], $\theta^M = \frac{\widehat{\theta}}{\sqrt{\alpha}} > \theta^E$
The reason for this overall underinvestment is linked to the low level of involvement of the *MB* in its project financing. This fact, leads the *MB* to implement an imperfect monitoring effort $y < 1$, differently to case 2/ where there is a perfect monitoring for a high L entrepreneur ($L > \frac{m+4}{2}$). Eventually, this fact implies a rise in the threshold-value, θ^M, with regard to other situations considered.

Before analyzing the previous results in more detail, we synthesize them in the following Proposition, making a comparison with the *EBC*:

PROPOSITION 2

Assuming no value for the informational spillovers (i.e., $\lambda = 1$), the MBC can mimic the EBC, that is $\theta^E = \theta^M$, in the following situations:
1/ When MB^i finances project i with a share $\alpha \geq \alpha[m] = \frac{2m}{m+4}$
2/ If $\frac{1}{2}\alpha[m] \leq \alpha < \alpha[m]$ and the entrepreneur is of bad quality $L > \frac{m+4}{2}$

If we assume the presence of spillovers (i.e., $\lambda > 1$), a reduction of the underinvestment, that is $\theta^M[\lambda > 1] < \theta^E$ is obtained for those situations such that $\theta^E = \theta^M[\lambda = 1]$

Proof

See point 5 in the Appendix

When the entrepreneur is a low-quality one, we have shown that we do not need the *MB* to finance the monitored project with a large share to obtain the same result as through the *EBC*. Under both financial schemes, the final lender carries out a perfect monitoring ($y = 1$), in order to provide incentives to the entrepreneur to display a large effort intensity h. We call this the *incentive effect* [15]. On the other hand, for a high-quality entrepreneur (a low L in our terminology), the incentive effect becomes less important. This is so, because the latter agent implements the maximum effort $h = 1$ without requiring a previous perfect monitoring $y = 1$ from the lender [16]. Therefore, the *MB* chooses its effort, y, weighting only its α-share in the financing of the monitored project. As in the *MBC*, $\alpha \leq 1$, a lower level of monitoring than in the *EBC* is obtained, and consequently a higher threshold-value follows.

As a final consideration, we know the use of linear utility functions prevents a systematic study of risk. Nevertheless, the fact that the *EBC* results can be obtained through a *MBC* arrangement, with a lower involvement in the monitored project ($\alpha < 1$), allows us to suggest for the case of risk-averse lenders and even if informational spillovers have no value (i.e., $\lambda = 1$), the *MBC* would be superior to the *EBC* in those situations where $\theta^M = \theta^E$ of Proposition 2. Once we consider spillover considerations, the previous result is reinforced.

3.4. SYNDICATED BANK CONTRACT

This financial arrangement as Horiuchi (1994) points out, is quite similar to the *MBC*. There is a "leading bank" ($\equiv LB$), which has a role much like the position of the main bank in a *MBC* arrangement. The difference is, that although both banks perform an ex-ante and interim monitoring (how the loan is used), a *LB* is not expected to be involved in any rescue operation ("ex-post" monitoring in *Aoki*'s words). Therefore, only the *MB* does all three types of monitoring. formalize this difference, rather than focusing on rescue actions, which are out of our approach, we consider the *LB* has no junior claims with regard to other lenders in case of shortages in the project returns. In fact we see this feature as an expression of the lower *LB*'s commitment towards a firm in a loan syndication. Apart from convenient, this assumption seems to be quite realistic in a loan syndication context.

To facilitate the comparisons between both financial contracts, we assume that each monitoring bank lends an α-share of the credit amount to its respective monitored project and $1-\alpha$ to the other project.

The resolution of the game follows the same pattern as before. The entrepreneur problem is given by expression (4), obtaining the previously found $h[y] = Min\{\frac{\mu^{SB}\theta X y}{l}, 1\}$. The μ^{SB} parameter, defined as the entrepreneur's share in the bargaining process between the lender and the entrepreneur, is absolutely identical to the *MBC* situation. That is $\mu^{SB} = \mu^{MB} = \frac{1}{2}$. On the other hand, the *LB*'s maximization problem (focusing in project 1, and considering that information spillovers have no value) becomes:

$$\begin{aligned} Max_{\{y_1\}}U^{LB} &\equiv \alpha[R[y_1]-2] - \frac{1}{2}m(y_1)^2 + (1-\alpha)[R[y_2]-2] \\ s.t.\ y_1 &\geq 0 \quad h = h[y],\ U^{LB} \geq 0 \qquad (11) \end{aligned}$$

The results of both maximization problems and the comparison to the threshold-value obtained under the *MBC* scheme, θ^M, are summarized in the following Proposition:

PROPOSITION 3

Assuming that information spillovers are of no value ($\lambda = 1$), the investment policy carried out by lenders under a MBC and a SBC is given by the following facts:

1/ The MBC mimics the SBC, whenever $\alpha \geq \frac{1}{2}\alpha[m]$

2/ For a small loan share by each monitoring bank ($\alpha < \frac{1}{2}\alpha[m]$), when the entrepreneur is a high quality one, $L < \frac{2}{(1-\alpha)}$, we obtain a lower underinvestment situation under the SBC than the MBC; that is, $\theta^M < \theta^S$. Otherwise both threshold-values coincide.

Proof:

See point 7 in the Appendix.

To understand this result, we have to stress that the monitoring policy is linked to two effects (if we neglect spillovers considerations):

1/ An *incentive effect*, previously explained, through which the monitor tries to provide incentives to the entrepreneur in order to implement higher effort levels. The higher the monitoring activities of the lender be, the higher the probability to reach the good state of nature, and the higher the incentives to acquire some specific knowledge by the entrepreneur are. This is so because this specific expertise has some value only in the good state of nature when it can generate potential rents in the second-period.

2/ A *financing effect*, related to the higher monitoring willingness once (the monitoring bank) has invested heavily in a project. This effect, is closely related with the specific contractual arrangements among fund providers concerning their sharing of rights and duties.

Our point is that the first effect becomes, in the case of a high-quality entrepreneur, irrelevant. This is so because the latter agent implements, by its proper nature, the maximum effort $h = 1$, without requiring the monitoring bank to give any incentive. As the share of the funds provided by both monitoring banks in a project becomes small ($\alpha < \frac{1}{2}\alpha[m]$), then, the second effect lowers as well. The distinction between the *MBC* and the *SBC*, comes from the fact that each *MB* is also a secondary bank (*SB*) which is hedged by the other bank, as it concedes senior rights over returns. This is not maintained by the *LB* in the *SBC*. If α is low, the role as *SBs* of all the *MBs* rises ($1 - \alpha$ high), generating a decrease in their incentives to monitor efficiently, due to each *MB* has senior rights over its main share of funds lent $(1 - \alpha)I$.

As a final remark, we want to stress that the *SBC* can be, once we ignore spillovers considerations, an arrangement as good as the *MBC*. This is specially relevant once we introduce some risk-aversion in the lender's utility function. In that case, the lower the involvement required by the monitoring bank (α) be, the lower the risk it bears will be. We have shown that for high-quality lenders, the lowest involvement of the *LB* defines the situation where the *SBC* is strictly superior to the *MBC*. Making use of this result, we can argue that in a risk-averse framework, risk considerations will make the *SBC* even better compared to the *MBC*.

3.5. COOPERATIVE CONTRACT SOLUTION

As a matter of completeness, we consider a last "cooperative" contract, which consists of two banks, "horizontally" linked providing funds with proportion α and $1-\alpha$. More specifically, bank 1 lends a share α of funds to finance project 1, and $1-\alpha$ to finance project 2, and the opposite for bank 2. Regarding monitoring tasks, each bank has the responsibility to monitor one project, but the cost to do so as well as the profits generated, are shared consistently with each of the banks financing shares. This feature is different to the *SBC* and the *MBC*, where the "monitoring bank", (the *LB* in the former contract, and the *MB* in the latter), was obliged to assume entirely the monitoring costs.

To fully characterize this contract resolution, we follow the same steps as before. First, we solve the entrepreneur problem which is equivalent to the one seen in (4). Second, we maximize lender 1's utility function, which is symmetric to lender 2's. The problem, focusing again in the situation where information spillovers have no value, is given by:

$$Max_{\{y_1\}}\alpha R_1[y_1] + (1-\alpha)R_2[y_2] - \frac{\alpha}{2}m(y_1)^2 - \frac{(1-\alpha)}{2}my_2^2 - 2$$

Our hypothesis concerning project's common nature and the way banks share their rights and responsibilities in this *CBC*, makes this financial relationship equivalent to the *EBC* (α-independent results). Moreover, when we consider spillover rents ($\lambda > 1$), this financial arrangement is superior to the *EBC*, and at least as good as the *MBC*. The analysis of the firm's bargaining power μ, will allow us to differentiate the CBC from the MBC. We are going to argue that under the CBC, $\mu = \frac{1}{3}$, unlike the previous scenarios where $\mu = \frac{1}{2}$. To obtain this result, we have to characterize the disagreement situation in the sequential game between the three agents (both lenders and the firm). To do so, we consider that each lender has the power to liquidate the project (i.e., end the game) even if the other lender does not want to. This assumption prevents the firm from forcing competition between lenders (this will be considered in the next scenario), and ensures all agents to have the same power. That is $\mu = \frac{1}{3}$, because the commitment of each of them is a necessary condition to generate value. Each lender can interrupt the project if they want, while the entrepreneur can make the project of no value by not participating in the second period. The distinction in μ under both financing scenarios is relevant because the threshold-values obtained are inversely related with $\mu(1-\mu)$, which is maximum when $\mu = \frac{1}{2}$. Thus, for a given μ, whenever the threshold values under the CBC and the MBC coincide [17], that is $\theta^C[\mu] \equiv \theta^E[\mu] = \theta^M[\mu]$, we can ensure a lower underinvestment under a *MBC* than under a *CBC* $(\theta^M[\mu^M] < \theta^C[\mu^C])$

With respect to an overall comparison of the three types of financial arrangement studied, we can word the following Proposition.

PROPOSITION 4

The MBC approach is at least as good as the EBC, the SBC, and the CBC approaches, if the informational spillovers have some value ($\lambda > 1$) and the monitoring bank participates in the monitored project financing with a share high enough ($\alpha \geq \alpha[m] \equiv \frac{2m}{m+4}$).
In case of a low involvement of the monitoring bank in the project (α low), the SBC is superior to the MBC.

Proof:

By Propositions 1, 2 and 3.

The intuition behind the superiority under the conditions defined of the *MBC* over the previous financial arrangements is that this financial arrangement combines in an optimal way three features previously referred: (i) an incentive effect, (ii) a financing effect, and (iii) the existence of some value in the information transferred from one project to the other.

More specifically, as we have outlined in Proposition 2, the *MBC* is superior to the *EBC* if (a) the monitoring bank's loan share is high enough or (b) when the entrepreneur's quality is low. We must notice the importance of the lender's market-structure effect in the *MBC* approach. This is related, as we previously described in the *MBC* characterization, to the existence of two incentives in the lender's actions. First, there exist a heavy penalty for the *MB* when the project becomes unsuccessful. Second, there exist valuable informational spillovers available to the *MB*, when it plays as a *SB* in the other project. Keeping these facts in mind, we can argue this financial contract outperforms the *EBC* whenever the other two effects are not "too low" under the *MBC* approach. For the first situation, high involvement of the monitoring bank, the financing effect under the *MBC* is not much lower than under the *EBC* (recall that $\alpha = 1$ for this case). In the second situation, low entrepreneur's quality, the incentive effect is high enough to compensate an eventual low financing effect. Here, the lender tries to provide incentives to the low-quality entrepreneur through an intensive monitoring (that is, $y = 1$).

At the time of carrying out the comparison with the *SBC*, Proposition 3 establish that both contracts lead to similar results, except for the case when the entrepreneur is of high quality and the monitoring banks participate with a small share in the financing of their own monitored project. In such situation, the *SBC* is superior to the *MBC*. The reason is, as explained before, that each *MB* has senior rights of payment over the larger share of the credit lent. This fact, which is not present under the *SBC*, diminish its incentives to monitor efficiently.

Regarding the *CBC*, we have proved that this contract behaves as the *EBC*, but it entails the monitoring lender with a smaller bargaining power ($\frac{1}{3}$). Moreover, this fact makes the lender's market-structure effect even larger under the MBC-CBC in comparison than for the *EBC* case.

3.6. NORMAL CONTRACT

Finally, and for comparative purposes, we describe one of the institutions previously described in the literature, the normal contract. This contract, defined in *Sheard (1994b)* has 2 main characteristics. First, it links the project returns to the specific bank's loan share, as we have done in the *SBC* and the *CBC*. Second, each bank decides its monitoring intensity on a non-cooperative basis. In this sense, as the monitoring tasks are not coordinated, we consider a competitive lender's market structure. This feature generates some redundancies and inefficiencies in the lenders' supervision tasks and, consequently generates a larger underinvestment than under the other financial contracts. Recall that in those contracts, the monitoring tasks are distributed on a firm basis, assigning an exclusive monitoring to each of them. This feature allows to avoid the free-rider situation we found in a *NC*, where each bank tries to monitor with an intensity not higher than other banks' intensities.

There are two additional features to consider in this *NC*. First, the firm enjoys a higher bargaining power compared to the previous cooperative contracts. Second, there is no sharing of informational spillovers between both lenders. Both features reinforce the conclusion that, under the type of game considered, a cooperative contract between lenders is superior to a non-cooperative arrangement. Consequently, our comparisons between the *MBC* and the previous cooperative contracts are more demanding on the *MBC* approach than Sheard's. His argument is only based on the superiority of the *MBC* over the non-cooperative *NC* because the *MBC* avoids the monitoring redundancies linked to the non-exclusive monitoring assignments among financial institutions. In contrast with Sheard's study, our argument neglects monitoring inefficiencies linked to free-rider considerations. In all the contracts considered each firm is supervised by a single bank. As we stressed previously, we emphasize the *MBC* superiority, using three features: (i) a lower financing exposure for the monitoring bank, (ii) a symmetric power between the monitoring lender and the firm and (iii) the possibility to obtain spillovers from involvement in different sectors.

4. DISCUSSION AND EMPIRICAL EVIDENCE

In order to provide an empirical perspective to our analysis, we now include some data concerning the relevance of the Main-Bank relationships in the Japanese economy. Aoki (1994b) refer to a survey (Shukan Daiyamondo, 1987) containing data from 110,000 companies with annual sales of over 8 million \$ each, and with Main Bank relationships. They define this system as "consisting in a nexus of main bank-firm relationships, reciprocal monitoring delegation arrangements among main banks, and linkages between the financial authorities and the banking industry". The study made in this paper, covers the first two points, and shows that when we take into account agents' quality, informational spillovers, bargaining power and risk considerations, the *MBC* can be as good as, and in some cases may outperform the three most common cooperative financial relationships among banks and firms (the so-called, Exclusive Bank Contract, the Syndicated Bank Contract, and the Cooperative Bank Contract).

It is important to note that the specific conditions needed to achieve these superior results for the *MBC*, are not extraordinary. Contrary to what one could think concerning the questionable validity of the *MB* system these days; we think it is more accurate to consider the *MB* as an ideal financial contract to be implemented when the monitoring bank (MB) really bears the costs of a project failure, when the monitoring technology is good enough (to lower the value of $\alpha[m]$), and when the entrepreneur's quality is low (l high).

In order to confront our conclusions with the data, we present the following table, extracted from Aoki (1994b), containing the evolution during the 80's of the share the main bank holds in respect to the overall bank lending amount to the 991 largest Japanese firms listed in the stock market.

1980	1981	1982	1983	1984	1985
13,3	13,5	13,6	13,6	14,2	14,8
1986	1987	1988	1989	1990	1991
15,3	15,6	15,7	16,1	15,8	15,0

As we can see in the table, the *MB* share during the 80's has been increasing over time. This result is consistent with our findings showing the increasing validity of this system as the monitoring technology improves; an expected outcome as we move through time. The point is that simultaneously to this positive technological feature, another effect has appeared during the 90's. Effect which is barely suggested in the table and that moves in the other direction. This is the increasing MB's opportunity costs to devote resources to monitoring, once the conglomerate it finances has become very large. The reason is that in such scenario, the state becomes the real risk-bearer of a system failure. This fact does not provide incentives to the *MB*s to spend resources in an efficient monitoring. If the process goes ahead, as the South Korea's crisis shows, the collapse of the system can follow. Apart from that, an increase in the entrepreneur's quality is expected over time. This feature also goes in the "negative" direction. In fact, in Japan is seen that as firms become better, they break their links with their original *MBs* (Toyota is a clear example).

Another aspect we neglect in our model is the treatment of financial distress. As Sheard (1994c) points out: *"The most striking aspect of the Main Bank system is the role the main bank plays when client firms encounter financial adversity"*. There are two main issues to study in such scenario: 1/ the governance of the corporate failure, and 2/ the process of asset reorganization (manager's replacement included). Because of the precise construction of our model, with informational symmetries and no-return in case of a bad state of nature, there is no room to bail out firms ex-post. Nevertheless, if we had considered returns of an amount $X_M > 0$ in the bad state, then, if we observe a project failure at the end of the first period, the continuation of the project would have been dependent on $(1-\mu)hX_M > I_2$ [18], with I_2 will be the additional funds to be provided in the second period to keep the project alive. Given that h is proportional to μ, the probability to continue the project would have been proportional to $\mu(1-\mu)$, and

reached a maximum at $\mu = \frac{1}{2}$. As we have previously shown, the MBC ensures this symmetric sharing between the lenders and the firm. This allows us to suggest that, if possible, firm's bailout, under the MBC, will be as high as any other arrangement.
Keeping this in mind, we can see that the validity of the *MB* arrangement, is even higher under short-term schemes than under long-term schemes. Under this approach, the disciplinary effect of the contract, combines with the commitment to make intensive bailouts. The following numbers, also extracted from Aoki (1994a), details the *MB* participation in the amount of short-term and long-term loans offered to the sample of firms mentioned earlier. The numbers confirm this hypothesis

	1980	1981	1982	1983	1984	1985
ST	23,1	22,4	21,9	21,1	21,2	21,3
LT	6,2	6,7	6,8	6,9	7,0	7,1
	1986	1987	1988	1989	1990	1991
ST	20,9	20,4	20,0	20,3	19,5	19,5
LT	8,0	8,6	9,1	9,6	10,3	9,5

Furthermore, we can observe the presence of a bias towards the use of short-term contracts, which has been the object of our analysis.

As a final remark it is important to note that to develop a *MB* system as an optimal financial arrangement, it is necessary to improve bank's monitoring skills in a context of low entrepreneur's quality. We may argue that in the *MB* system, the interests of lenders and the entrepreneur are aligned to give each others incentives to improve their skills through time. The point is that in such a context, as firms' quality grows, other arrangements like the *SBC* can be superior to the *MBC*. Although, the formal study of the previous remark goes well beyond the scope of this work, and it would require a dynamic model, we have provided some clues of this important issue. To this respect, it is particularly necessary to understand the *Main Bank* System as a nexus of relationships in Aoki's words.

We already mentioned in the introduction that the Main Bank is a typical institution of the Japanese financial system, although we believe a similar approach could be implemented in other bank-oriented countries. In particular, we are interested in the application of these ideas to the Spanish economy, and more specifically to an important framework: the presence of "núcleos duros" or large and stable shareholders in most of the large firms recently privatized. In both

cases, financial institutions play key roles in the governance of firms.
Some large Spanish firms, previously state-owned, have been privatized in recent years and the former owner, the Government, has encouraged in many cases the formation of a reduced group of investors, mostly large banks, able to control the firm. This process has facilitated the appearance of two different small groups of institutions that repeat representation in several firms. Thus, institutional share holding in those companies was "assigned" to one group or the other. It is in this context where we believe a kind of Main Bank approach could be developed: bank A of the group could specialize in monitoring some firms controlled by the group, while behaving as a second bank ("free-riding" in our terminology) in other cases where other banks of the same "núcleo duro" perform the monitoring tasks. The relevant point becomes to provide the lenders with incentives to monitor efficiently. As it has been previously suggested, that the economic authority must signal it will not bear the costs of possible failures. In this line García-Cestona (1996) suggests, the economic authority could give the financial institutions of a "núcleo duro" full rights over the recently privatized firms. This will undoubtedly stimulate their efficient behavior.

5. CONCLUDING REMARKS

Our main result is that a Main Bank Contract (*MBC*) proves to be, when certain conditions are met, the optimal financial arrangement to finance a wide

range of projects characterized by their quality θ. This result is obtained in a symmetric information setting, and for projects where supervision and transfer of some knowledge is essential to achieve project success. Under this framework we compare the *MBC* with four alternative contracts; the Exclusive Bank Contract (*EBC*), the Syndicated Bank Contract (*SBC*), the Cooperative Bank Contract (*CBC*) and the Normal Contract (*NC*). In all five cases we face an *underinvestment* situation with respect to an optimal solution, but the problem becomes the least in the *MBC*. The intuition behind this result is that the *MBC* combines, in an optimal way, three elements: 1/ One of the Banks (called the Main Bank, *MB*) holds all property rights assigned to financial intermediaries. 2/ Sharing the loan with other institutions, banks lower their risk's exposure. 3/ This approach facilitates the acquisition of informational spillovers.

The first feature comes as a direct consequence of our characterization of a *MB:* a financial institution with monitoring and hedging duties with respect to other participants, but with residual rights over the assets. These rights are important in its negotiation with the firm. The second feature is linked to the existence of a cross-relationship among the banks that join a *MBC*. They hedge risks when they act as a main bank and enjoy a lower risk as a second bank. Finally, the third feature responds to the fact that lending to firms located in different markets may help the bank to acquire informational specificities linked to these markets. Information that could be used in future financial relationships, and therefore, have some value for the lender.

The differences found in the bank's monitoring policy are eventually, what make one financial arrangement superior to the other. To describe such policies, we mention the presence of three features. The first one is *the incentive effect* through which the monitor tries to encourage the entrepreneur to implement a high effort. This effect is linked to the lender's bargaining power, which defines the lender share in the returns generated by each project. On the other hand, *the financing effect* relates to the higher monitoring willingness of the bank the higher its financing share of the monitored project is. This is closely connected with the particular structure of the lender's market. Each financial arrangement considered, imposes specific relations among the fund providers.

As a final point we would like to translate our analysis to study some features of the current Spanish Banking situation. From our results, we can rationalize the policy followed by the main financial institutions ready to dismantle their cross-relationships with the strategic Spanish industrial groups. The question that arises naturally is to understand why the Spanish banks have preferred to reduce dramatically its participation in firms, rather than implementing a *MB*-type of arrangement. In that sense, our model may provide some explanations. In particular, once the entrepreneur's quality becomes higher and the financing share of the monitoring bank lowers, outcomes which are expected as times goes through, then the optimally of the *MBC* will no longer be maintained.

Many questions remain open: How does a bank collect information or support related firms to undergo financial distress? Given our model is a symmetric information one, we cannot address here this question. What are the risks associated with the ownership of firms' equity? Although the role of indirect financial intermediation has been approached in different ways, we have chosen here the delegated monitoring view that constitutes the main approach today.

Concerning the limitations of our approach, we do not distinguish between different types of monitoring (ex-ante, interim, ex-post) and we just refer to this activity as a "monitoring-incentive" task. Neither we explain in detail how this activity translates into the improvement of the firm's success. Further, the same construction of the model does not allow for possible bailouts. In our defense, we might say that once this possibility is included, the results should be even more biased in favor of the *MBC* option. Finally we would like to focus on the informational and incentive problems, without sacrificing risk considerations as we did using a risk-neutral model. This is an important issue in the analysis of different bank arrangements in order to lend money to a group of firms. Nevertheless, this has been left for future research.

APPENDIX

$\boxed{1}$

The problem to maximize is:

$$Max_{\{y,h\}}U^{FB} \equiv \theta yhX - \tfrac{1}{2}lh^2 - \tfrac{1}{2}my^2 - 2$$
$$s.t.\ \ U^{FB} \geq 0 \quad 0 \leq y \leq 1 \quad 0 \leq h \leq 1$$

The **FOC** leads to:

$$\frac{\partial}{\partial y}U^{FB} = 0 \Rightarrow y = \begin{cases} 1 & If\ \theta > \frac{m}{hX} \\ \frac{\theta hX}{m} & If\ \theta \leq \frac{m}{hX} \end{cases} \quad (A1.1) \quad \frac{\partial}{\partial h}U^{FB} = 0 \Rightarrow h = \begin{cases} 1 & If\ \theta > \frac{l}{yX} \\ \frac{\theta yX}{l} & If\ \theta \leq \frac{l}{yX} \end{cases} \quad (A1.2)$$

And the **SOC** requires that $\theta > \frac{\sqrt{ml}}{X} \equiv \underline{\theta}$

First we treat the $m \geq l$ situation:

When $\theta > \frac{m}{X}$ we have two possibilities:

If $h < h^* \equiv \frac{m}{\theta X} \leq 1 \Rightarrow y = \frac{\theta hX}{m}$, therefore, as $\frac{\theta yX}{l} = h\theta^2\frac{X^2}{ml} > h$, (A1.2) ensures that $h = 1$, which is a contradiction with $h < h^* \leq 1$, concluding that $h \geq h^* \Rightarrow \theta \geq \frac{m}{hX}$ which leads to $\mathbf{y = 1}$. But as $m \geq l$ we can also ensure that $\theta \geq \frac{l}{yX}$ and by (A1.2) $\mathbf{h = 1}$

When $\frac{\sqrt{ml}}{X} < \theta \leq \frac{m}{X}$, (A1.1) shows that $y = \frac{\theta hX}{m}$ and by (A1.2), we have two possibilities: (i) $h = \frac{\theta yX}{l} = \frac{\theta^2X^2}{ml}h > h$ (contradiction). (ii) $h = 1 \Rightarrow y = \frac{\theta X}{m}$

Synthesizing, the optimal policy in this $l < m$ situation is:

$$y = \begin{cases} \theta\frac{X}{m} & If\ \ \underline{\theta} < \theta \leq \frac{m}{X} \\ 1 & If\ \ \theta > \frac{m}{X} \end{cases} \quad and\ \ h = 1\ (A1.3)$$

$U^{FB} \geq 0$ condition leads to the following threshold-values θ^{FB}:

If $\theta \leq \frac{m}{X}$ then $U^{FB} \geq 0 \Rightarrow \theta \geq \theta^{FB} = \underline{\theta}\sqrt{1 + \frac{4}{l}}$ and to be consistent, $l \leq m - 4$

If $\theta > \frac{m}{X}$, $U^{FB} \geq 0 \Rightarrow \theta \geq \theta^{FB} = \frac{1}{X}\{2 + \frac{1}{2}(m + l)\}$ with $l > m - 4$

As a final synthesis we have for $\boxed{l < m}$:

$$\theta^{FB} = \begin{cases} \underline{\theta}\sqrt{1 + \frac{4}{l}} & If\ \ l \leq m - 4 \\ \frac{1}{X}\{2 + \frac{1}{2}(m + l)\} & If\ \ l > m - 4 \end{cases} \quad (A1.4)$$

In the same way, (just changing $l \leftrightarrow m$, we can see the $\boxed{l > m}$ situation

$$\theta^{FB} = \begin{cases} \frac{1}{X}\{2 + \frac{1}{2}(m + l)\} & If\ \ l < m + 4 \\ \underline{\theta}\sqrt{1 + \frac{4}{m}} & If\ \ l \geq m + 4 \end{cases} \quad (A1.5)$$

Finally, note that our assumption $m \leq 4 \Rightarrow l \geq m - 4$

$\boxed{2}$
The entrepreneur faces this maximization problem [19]:

$$\begin{aligned} Max_{\{h\}}\, U^{Ent} &\equiv \mu\theta yhX - \frac{1}{2}lh^2 \\ s.t.\ U^{Ent} &\geq 0\, and\, 0 \leq h \leq 1 \quad (A2.1) \end{aligned}$$

Solving, we get the solution:

$$h = Min\{1, \frac{\mu\theta Xy}{l}\} \ \ (A2.2)$$

Note that $U^{Ent} = \frac{l}{2}[Min\{1, y/\frac{l}{\mu\theta X}\}]^2 \geq 0$, and the entrepreneur's participation constraint is never binding.

Going ahead, the lender tries to maximize its own utility function, U^{EB}:

$$\begin{aligned} Max_{\{y\}}\, U^{EB} &\equiv \theta y(1-\mu)(hX) - \frac{1}{2}my^2 - 2 \\ s.t.\ U^{EB} &\geq 0\ ,\ 0 \leq y \leq 1\ \ and\ \ h = h[y] \quad (A2.3) \end{aligned}$$

The **FOC** lead to:

$$\frac{\partial}{\partial y}U^{EB} = \begin{cases} y[\frac{2}{l}\mu(1-\mu)X^2\theta^2 - m] & If\ \ y \leq \frac{l}{\mu\theta X} \\ (1-\mu)\theta X - my & If\ \ y > \frac{l}{\mu\theta X} \end{cases} \ \ (A2.4)$$

To define agents' policies, we differentiate three cases, according to $L \equiv \frac{l(1-\mu)}{\mu}$ [20]

A/ $\boxed{L < \frac{m}{2}} \Rightarrow \frac{l}{\mu X} < \widehat{\theta} \equiv \frac{1}{X}\sqrt{\frac{ml}{2\mu(1-\mu)}} \Rightarrow \frac{l}{\mu\theta X} < 1\ \ \forall\theta \geq \widehat{\theta}$

$$y = \begin{cases} 0 & If \quad \theta < \widehat{\theta} \\ \frac{l}{\mu\theta X} & If \quad \widehat{\theta} \leq \theta < \sqrt{2}\widehat{\theta} \\ \frac{(1-\mu)\theta X}{m} & If \quad \sqrt{2}\widehat{\theta} \leq \theta < \frac{m}{(1-\mu)X} \\ 1 & If \quad \theta \geq \frac{m}{(1-\mu)X} \end{cases} \qquad h = \begin{cases} 0 & If \quad \theta < \widehat{\theta} \\ 1 & If \quad \widehat{\theta} \leq \theta \end{cases} \quad (A2.5)$$

Note that y decreases from $\widehat{\theta}$ to $\sqrt{2}\widehat{\theta}$, and then increases again.
To determine the θ-threshold-values, we have to impose $\mathbf{U}^{EB} \geq 0$.

$$U^{EB} = \begin{cases} -2 & If \quad \theta < \widehat{\theta} \\ L - \frac{1}{2}m(\frac{l}{\mu\theta X})^2 - 2 & If\ \ \widehat{\theta} \leq \theta < \sqrt{2}\widehat{\theta} \\ \frac{1}{2m}[(1-\mu)\theta X]^2 - 2 & If\ \ \sqrt{2}\widehat{\theta} \leq \theta < \frac{m}{(1-\mu)X} \\ (1-\mu)\theta X - \frac{1}{2}m - 2 & If\ \ \frac{m}{(1-\mu)X} \leq \theta \end{cases} \qquad (A2.6)$$

To know θ^E, we impose $U^{EB} \geq 0$, and use the fact that $\frac{\partial}{\partial\theta}U^{EB}[\theta] \geq 0$
As $U^E[\theta = \widehat{\theta}] = -2 < 0$ we can assure that $\theta^E > \widehat{\theta}$
$U^{EB}[\theta = \sqrt{2\widehat{\theta}}] = \frac{L}{2} - 2$
$U^{EB}[\theta = \frac{m}{(1-\mu)X}] = \frac{1}{2}m - 2$.
As $m \leq 4$, we obtain $\theta^E \geq \frac{m}{(1-\mu)X} \Rightarrow \theta^E = \frac{m+4}{2(1-\mu)X}$

B/ $\boxed{\frac{m}{2} \leq L < m} \Rightarrow \frac{l}{\mu X} \geq \widehat{\theta}$and $\sqrt{2\widehat{\theta}} < \frac{m}{(1-\mu)X}$

Following a similar reasoning as in **A/**, agents' policy turns out to be:

$$y = \begin{cases} 0 \quad If \quad \theta < \widehat{\theta} \\ 1 \quad If \ \widehat{\theta} \leq \theta \leq \frac{l}{\mu X} \\ \frac{l}{\mu\theta X} \ If \ \frac{l}{\mu X} < \theta \leq \sqrt{2\widehat{\theta}} \\ \frac{(1-\mu)\theta X}{m} \quad If \ \sqrt{2\widehat{\theta}} \leq \theta < \frac{m}{(1-\mu)X} \\ 1 \quad If \quad \frac{m}{(1-\mu)X} \leq \theta \end{cases} \qquad h = \begin{cases} 0 \quad If \ \ \theta < \widehat{\theta} \\ \frac{\mu\theta X}{l} \ If \ \widehat{\theta} \leq \theta \leq \frac{l}{\mu X} \\ 1 \quad If \quad \frac{l}{\mu X} < \theta \end{cases} \quad (A2.7)$$

Again, we can compute U^{EB} in a similar way as (A2.6), and the corresponding θ^E value becomes $\theta^E = \frac{m+4}{2(1-\mu)X}$ as $\theta^E \geq \frac{m}{(1-\mu)X}$

C/ $\boxed{L \geq m}$

In this case the optimal policy is much more easier:

$$y = \begin{cases} 0 \quad If \ \ \theta < \widehat{\theta} \\ 1 \quad If \ \ \widehat{\theta} \leq \theta \end{cases} \qquad h = \begin{cases} 0 \quad If \ \ \theta < \widehat{\theta} \\ \frac{\mu\theta X}{l} \ If \ \widehat{\theta} \leq \theta < \frac{l}{\mu X} \\ 1 \quad If \quad \frac{l}{\mu X} \leq \theta \end{cases} \quad (A2.8)$$

We can compute straightforwardly θ^E:
We have two cases:
When $m \leq L \leq \frac{m+4}{2} \Rightarrow \theta^E \geq \frac{l}{\mu X} \Rightarrow \theta^E = \frac{m+4}{2(1-\mu)X}$
If $\frac{m+4}{2} \leq L \Rightarrow \widehat{\theta} \leq \theta^E \leq \frac{l}{\mu X} \Rightarrow \theta^E = \frac{1}{(1-\mu)X}\sqrt{\frac{m+4}{2}L}$
If we joint together the previous expressions we have that:

$$\theta^E = \frac{1}{(1-\mu)X}\sqrt{\frac{m+4}{2}Max\{\frac{m+4}{2}, L\}} \quad (A2.9)$$

$\boxed{3}$

In order to carry out the comparison between the Social Optimum and the *EBC*, we are going to distinguish different situations, according the relationship between entrepreneur's quality and lender's one. We use expressions (A1.4) and (A1.5) for θ^{FB} ; and (A2.9) and (A2.10) for θ^{EB}, keeping in mind that $\mu^{EB} = \frac{1}{2}$

1/ When the lender and the entrepreneur are of similar quality ($l \simeq m \equiv z$), we obtain $\theta^{FB} = \frac{1}{X}\{2+z\} < \theta^{E} = \frac{1}{X}(4+z)$. An underinvestment follows, which is independent of the quality level z as $\theta^{E} - \theta^{FB} = \frac{2}{X}$.

2/ Low-quality lender and high-quality entrepreneur ($l \ll m$, we model this case considering assuming that $l \rightarrow m-4$)
$\theta^{FB} = \frac{1}{X}\sqrt{m}\sqrt{l+4}$ ($l \leq m-4$) and $\theta^{E} = \frac{m+4}{X}$ ($l < 4$). If $l \rightarrow m-4 \Rightarrow \theta^{E}/\theta^{FB} = 1 + \frac{4}{m}$. Therefore we also get an underinvestment.

3/ High-quality lender and low-quality entrepreneur ($l \gg m$):
$\theta^{FB} = \frac{1}{X}\sqrt{l}\sqrt{m+4}$ ($l > m+4$) and $\theta^{E} = \frac{\sqrt{2}}{X}\sqrt{l}\sqrt{m+4}$ ($l > 4$). As $\theta^{FB} < \theta^{E}$ we recover the underinvestment situation.

Finally we can see that in situation 3/, the ratio $\theta^{E}/\theta^{FB} = \sqrt{2}$ is lower than in situation 2/, where $\theta^{E}/\theta^{FB} = 1 + \frac{4}{m} > \sqrt{2}$ for $m \leq 4$. The conclusion is: to reduce underinvestment in case of large differences in agents' quality, the agent who chooses first has to be of higher quality than the other.

$\boxed{4}$

The entrepreneur's optimal policy is the same as (A2.2)
With regard to the *MB* problem, we have:

$$\frac{\partial}{\partial y_1}U_1^{MB} = \begin{cases} \alpha\frac{\partial R[y]}{\partial y_1} - m + \frac{\partial U_2^{SB}}{\partial y_1} & If \;\; y_1 > \overline{y} \\ \frac{\partial R[y]}{\partial y_1} - m + \frac{\partial U_2^{SB}}{\partial y_1} & If \;\; \underline{y} \leq y_1 \leq \overline{y} \\ -m & If \;\; y_1 < \underline{y} \end{cases} \quad (A4.1)$$

$$R[y] = \begin{cases} (1-\mu)\theta X y & If \;\; y > \frac{l}{\mu\theta X} \\ \frac{1}{l}(1-\mu)\mu\theta^2 X^2 y^2 & If \;\; y \leq \frac{l}{\mu\theta X} \end{cases} \quad (A4.2)$$

Where we have used that $\frac{\partial U_2^{SB}}{\partial y_1} = 0$, and the values $\overline{y}$ ($\underline{y}$) are defined by the expressions $R[\overline{y}] = 2$ and $R[\underline{y}] = 2(1-\alpha)$.
To be systematic let us define the following scenarios. If $y \leq \frac{l}{\mu\theta X}$ ($y > \frac{l}{\mu\theta X}$) we have three different possibilities. We call S_2 (S_2') the situation $y_1 > \overline{y}$, S_1 (S_1') if $\underline{y} \leq y_1 \leq \overline{y}$ and finally S_0 (S_0') when $y_1 < \underline{y}$. These last ones are not relevant, because lead to a zero monitoring and to a zero entrepreneur's effort.

In $S_2 \Rightarrow \frac{\partial}{\partial y_1} U_1^{MB} = \begin{cases} > 0 & If\ \theta_1 > \frac{1}{\sqrt{\alpha}}\widehat{\theta} \\ < 0 & If\ \theta_1 < \frac{1}{\sqrt{\alpha}}\widehat{\theta} \end{cases}$ $(A4.3)$

In $S_1 \Rightarrow \frac{\partial}{\partial y_1} U_1^{MB} = \begin{cases} > 0 & If\ \theta_1 > \widehat{\theta} \\ < 0 & If\ \theta_1 < \widehat{\theta} \end{cases}$ $(A4.4)$

On the other hand for (S_1') and (S_2'), we have:

In $S_2' \Rightarrow \frac{\partial}{\partial y_1} U_1^{MB} = \alpha(1-\mu)\theta X - my \Rightarrow y = \frac{\alpha(1-\mu)\theta X}{m}$ $(A4.5)$

In $S_1' \Rightarrow \frac{\partial}{\partial y_1} U_1^{MB} = (1-\mu)\theta X - my \Rightarrow y = \frac{(1-\mu)\theta X}{m}$ $(A4.6)$

Therefore, within S_1' and S_2' we obtain an interior solution for y, but within S_1 and S_2, the result is a corner solution.

Equation (A4.2), shows that for $\overline{y} \leq \frac{l}{\mu\theta X}$, then $L \geq 2$ is required [21] (we call this framework F_2). This is relevant, because as y increases, we obtain the following sequence of scenarios $S_1 \to S_2 \to S_i'$ $\{i = 1, 2\}$. This sequence varies for $L \leq 2$ (F_1 framework). In that case the threshold-value $\frac{l}{\mu\theta X}$ that defines the S_1' and S_2' is lower than the corresponding to the S_2. Therefore, we get in the following sequential ordering: $S_1 \to S_1' \to S_2'$.

We denote with $\widetilde{\theta}$, the θ-value which ensures the existence of scenarios S_2 and S_2' that is, makes $\overline{y} < 1$. This value will depend if $L \gtrless 2$. In the upper alternative $\overline{y} = \frac{1}{(1-\mu)\theta X}\sqrt{2L} \Rightarrow \widetilde{\theta} = \frac{1}{(1-\mu)X}\sqrt{2L} \leq \frac{l}{\mu X}$. In the lower case, we have $\overline{y} = \frac{2}{(1-\mu)\theta X}$ and consequently $\widetilde{\theta} = \frac{2}{(1-\mu)X} \geq \frac{l}{\mu X}$. If we put both cases in a joint expression, we obtain: $\widetilde{\theta} = \frac{\sqrt{2}}{(1-\mu)X}\sqrt{Max\{2, L\}}$ $(A4.7)$

All the details of agents' optimal policy are available upon request. In this appendix we focus on the minimum characterization of y and h to define θ^M.

To present a systematic exposition, we consider different regions, according to the value of α:

1/ $\boxed{\text{Case } \alpha \geq \alpha[m]}$ [22]

We split the study in different regions sensible to the L value:

1.1/ If $L < \frac{m}{\alpha}$

As $y[\theta \geq \frac{m}{\alpha(1-\mu)X}] = h[\theta \geq \frac{m}{\alpha(1-\mu)X} > \frac{l}{\mu X}] = 1$, we can compute
$U^{MB}[\theta = \frac{m}{\alpha(1-\mu)X}] = \frac{1}{2}m - 2 \leq^{23} 0 \Rightarrow \theta^M \geq \frac{m}{(1-\mu)X} \Rightarrow \theta^M = \frac{m+4}{2X(1-\mu)}$

1.2/ If $L \geq \frac{m}{\alpha}$

In this case, as $\frac{l}{\mu X} \geq \frac{m}{\alpha(1-\mu)X}$, we have $y = 1\ \forall\theta > \frac{m}{\alpha(1-\mu)X}$ but $h = 1$ only for $\theta > \frac{l}{\mu X}$. Computing $U^{MB}[\theta = \frac{l}{\mu X}] = L - \frac{m+4}{2}$; therefore $U^{MB}[\theta = \frac{l}{\mu X}] \lessgtr 0$ if $L \lessgtr L[m] \equiv \frac{m+4}{2}$. This inequality, jointly with the fact that $L[m] \geq \frac{m}{\alpha}$ when $\alpha \geq \alpha[m]$, lead us to consider two situations, depending on L:

$\frac{m}{\alpha} \leq L \leq L[m] \Rightarrow \theta^M \geq \frac{l}{\mu X} \Rightarrow \theta^M = \frac{m+4}{2X(1-\mu)}$ (Where we have used $y = h = 1$)
$L[m] \leq L \Rightarrow \widehat{\theta} \leq \theta^M \leq \frac{l}{\mu X} \Rightarrow \theta^M = \frac{1}{(1-\mu)X}\sqrt{\frac{m+4}{2}L}$ (where, we have used the fact that $h = \frac{\mu\theta X}{l}$ and $y = 1$). Synthesizing all the results, we get what we obtained under the EBC

$$\theta^M = \frac{1}{(1-\mu)X}\sqrt{\frac{m+4}{2}Max\{\frac{m+4}{2}, L\}} \quad (A4.8)$$

2/ $\boxed{\text{Case } \frac{1}{2}\alpha[m] \leq \alpha < \alpha[m]}$

This interval of α values, can only be possible if $\frac{2\alpha}{1-\alpha/2} < m$
As $\widetilde{l} \equiv \frac{2}{(1-\alpha/2)} \leq L[m] \equiv \frac{m+4}{2} \leq \frac{m}{\alpha}$ for $\frac{1}{2}\alpha[m] \leq \alpha < \alpha[m]$, we have:

2.1/ $L < \widetilde{l}$

As $y[\sqrt{\frac{2}{\alpha}}\widehat{\theta} \leq \theta \leq \frac{m}{\alpha(1-\mu)X}] = \alpha(\frac{(1-\mu)\theta X}{m}) \geq \frac{l}{\mu\theta X}$ (Scenario S_2'). This ensures that $h = 1$. Using this fact we can compute:
$U^{MB}[\theta = \sqrt{\frac{2}{\alpha}}\widehat{\theta}] = L(1 - \frac{\alpha}{2}) - 2 < 0$ if $L < \widetilde{l} \Rightarrow \theta^M > \sqrt{\frac{2}{\alpha}}\widehat{\theta}$
$U^{MB}[\theta = \frac{m}{\alpha(1-\mu)X}] = m(\frac{1}{\alpha} - \frac{1}{2}) - 2 > 0$ if $\alpha < \alpha[m]$. Therefore, we can conclude:
$\sqrt{\frac{2}{\alpha}}\widehat{\theta} < \theta^M < \frac{m}{\alpha(1-\mu)X} \Rightarrow U^{MB}[\theta^M] = 0 \Leftrightarrow \theta^M = \frac{m}{(1-\mu)X}\sqrt{\frac{2}{m\alpha(1-\alpha/2)}}$

2.2/ $\widetilde{l} \leq L \leq L[m]$

In this case, it is straightforward to note $\frac{l}{\mu X} \leq \sqrt{\frac{2}{\alpha}}\widehat{\theta}$. Making use of this fact: $y[\frac{l}{\mu X} \leq \theta \leq \sqrt{\frac{2}{\alpha}}\widehat{\theta}] = \frac{l}{\mu\theta X}$ and $h = 1$. With this expression, we can compute the sign of $U^{MB}[\theta = \frac{l}{\mu X}] = L - L[m] \leq 0$ due to $L \leq L[m]$; therefore $\theta^M \geq \frac{l}{\mu X}$
If we check the value $U^{MB}[\theta = \sqrt{\frac{2}{\alpha}}\widehat{\theta}] = L(1 - \frac{\alpha}{2}) - 2 \geq 0$ if $L \geq \widetilde{l}$
The previous inequalities, leads to $\frac{l}{\mu X} \leq \theta^M \leq \sqrt{\frac{2}{\alpha}}\widehat{\theta} \Rightarrow \theta^M = \frac{\sqrt{m}}{(1-\mu)X}\frac{L}{\sqrt{2L-4}}$

2.3/ $L[m] < L$

We have to note that $y[\frac{\widehat{\theta}}{\sqrt{\alpha}} \leq \theta \leq \frac{l}{\mu X}] = h[\theta \geq \frac{l}{\mu X}] = 1$. As $U^{MB}[\theta = \frac{l}{\mu X}] = L - L[m] > 0$ due to $L > L[m]$; then $\theta^M < \frac{l}{\mu X}$
On the other hand $U^{MB}[\theta = \frac{\widehat{\theta}}{\sqrt{\alpha}}] = \frac{1}{2}m[\frac{1}{\alpha} - 1] - 2 \leq 0$ if $\alpha \geq \frac{1}{2}\alpha[m] \Rightarrow \theta^M \geq \frac{\widehat{\theta}}{\sqrt{\alpha}}$
The above implications, lead us to $\frac{\widehat{\theta}}{\sqrt{\alpha}} \leq \theta^M \leq \frac{l}{\mu X} \Rightarrow \theta^M = \frac{1}{(1-\mu)X}\sqrt{\frac{m+4}{2}L}$

If we put all the results together, we obtain:

$$\theta^M = \begin{cases} \frac{\sqrt{m}}{(1-\mu)X}\sqrt{\frac{2}{\alpha(1-\alpha/2)}} & If \ L < \frac{4}{2-\alpha} \\ \frac{\sqrt{m}}{(1-\mu)X}(\frac{L}{\sqrt{2L-4}}) & If \ \frac{4}{2-\alpha} \leq L < \frac{m+4}{2} \\ \frac{1}{(1-\mu)X}\sqrt{\frac{m+4}{2}L} & If \ \frac{m+4}{2} \leq L \end{cases} \quad (A4.9)$$

3/ $\boxed{\text{Case } \alpha < \frac{1}{2}\alpha[m]}$

We proceed as in the previous α-region, to differentiate three regions according to the values of L:

3.1/ $L < \widetilde{l}$

The analysis is the same as 2.1/ ; therefore $\theta^M = \frac{m}{(1-\mu)X}\sqrt{\frac{2}{m\alpha(1-\alpha/2)}}$

3.2/ $\widetilde{l} \leq L \leq l^* \equiv \frac{2}{(1-\alpha)} < L[m] = \frac{m+4}{2}$ (when $\alpha < \frac{1}{2}\alpha[m]$)

This is different to 2.2/. When $\alpha \leq \frac{1}{2}\alpha[m] \Rightarrow \frac{l}{\mu X} \leq \frac{1}{\sqrt{\alpha}}\widehat{\theta}$, which is relevant to characterize agents' policies:

$y[\frac{l}{\mu X} \leq \theta \leq \frac{1}{\sqrt{\alpha}}\widehat{\theta}] = \overline{y}$ and $y[\frac{\widehat{\theta}}{\sqrt{\alpha}} \leq \theta \leq \sqrt{\frac{2}{\alpha}}\widehat{\theta}] = \frac{l}{\mu\theta X}$ with $h = 1$. Computing $U^{MB}[\theta = \frac{\widehat{\theta}}{\sqrt{\alpha}}] = L(1-\alpha) - 2 \leq 0$ if $L \leq l^* \Rightarrow \theta^M \geq \frac{\widehat{\theta}}{\sqrt{\alpha}}$

On the other hand, we know that $U^{MB}[\theta = \sqrt{\frac{2}{\alpha}}\widehat{\theta}] \geq 0$ if $L \geq \widetilde{l}$; therefore $\frac{\widehat{\theta}}{\sqrt{\alpha}} \leq \theta^M \leq \sqrt{\frac{2}{\alpha}}\widehat{\theta} \Rightarrow \theta^M = \frac{\sqrt{m}}{(1-\mu)X}\frac{L}{\sqrt{2L-4}}$

3.3/ $l^* < L$

We pointed in 3.2/ that $l^* < L \Rightarrow \theta^M \leq \frac{\widehat{\theta}}{\sqrt{\alpha}}$ but for θ-values lower than $\frac{\widehat{\theta}}{\sqrt{\alpha}}$ there is a discontinuity in y as we move from scenario S_1' to S_2. In particular $y[\widetilde{\theta} \leq \theta < \frac{\widehat{\theta}}{\sqrt{\alpha}}] = \overline{y}[\theta] \leq \frac{l}{\mu\theta X}$ if $\theta \leq \frac{\widehat{\theta}}{\sqrt{\alpha}}$.

If we check $U^{MB}[\theta \to \frac{\widehat{\theta}}{\sqrt{\alpha}}] =^{24} -2(\frac{\widehat{\theta}}{\theta})^2 < 0 \Rightarrow \theta^M \to \frac{\widehat{\theta}}{\sqrt{\alpha}}$

Concluding in any case that $\theta^M = \frac{\widehat{\theta}}{\sqrt{\alpha}}$

As a final synthesis, θ^M for $\alpha < \frac{\alpha[m]}{2}$ becomes:

$$\theta^M = \begin{cases} \frac{\sqrt{m}}{(1-\mu)X}\sqrt{\frac{2}{\alpha(1-\alpha/2)}} & If\ L < \frac{4}{2-\alpha} \\ \frac{\sqrt{m}}{(1-\mu)X}(\frac{L}{\sqrt{2L-4}}) & If\ \frac{4}{2-\alpha} \leq L < \frac{2}{1-\alpha} \\ \frac{\widehat{\theta}}{\sqrt{\alpha}} & If\ \frac{2}{1-\alpha} \leq L \end{cases} \quad (A4.10)$$

$\boxed{5}$

At the time of carry out the comparison with the *EBC*, we focus on scenario ($\alpha[m]/2 \leq \alpha \leq \alpha[m]$), and scenario ($\alpha < \alpha[m]/2$). Note that for $\alpha \geq \alpha[m]$, expressions (A4.8) and (A2.9) ensure that $\theta^M = \theta^E$.

- When $\alpha[m]/2 \leq \alpha < \alpha[m]$, the relevant cases are:

a/ For $L < \frac{4}{2-\alpha} \Rightarrow \theta^M = \frac{2\sqrt{m}}{X}\sqrt{\frac{4}{\alpha(2-\alpha)}} > \frac{2\sqrt{m}}{X}\sqrt{\frac{4}{\alpha[m](2-\alpha[m])}} = \frac{2}{X}\sqrt{(\frac{m+4}{2})^2} = \theta^E$

b/ $\frac{4}{2-\alpha} \leq L < \frac{m+4}{2} \Rightarrow \theta^M = \frac{\sqrt{m}}{(1-\mu)X}(\frac{L}{\sqrt{2L-4}}) \Rightarrow \frac{d\theta^M}{dL} \geq 0$ for $L > 4 \geq \frac{4}{2-\alpha}$.

As $\theta^M[L = \frac{4}{2-\alpha}] = \theta^E$ and $\frac{d\theta^E}{dL} = 0$, we also can ensure $\theta^M > \theta^E$

- When $\alpha < \frac{1}{2}\alpha[m]$, the only case we have to analyze is $L \geq \frac{1}{2-\alpha} < \frac{m+4}{2}$

a/ When $\frac{1}{2-\alpha} \leq L < \frac{m+4}{2} \Rightarrow \theta^M = \frac{\widehat{\theta}}{\sqrt{\alpha}} = \frac{2}{X}\sqrt{\frac{m}{2\alpha}L} \Rightarrow \frac{d\theta^M}{dL} \geq 0$. As $\theta^M[L = \frac{1}{2-\alpha}] = \frac{m+4}{X} = \theta^E$ and $\frac{d\theta^E}{dL} = 0$, we obtain $\theta^M > \theta^E$

b/ $L \geq \frac{m+4}{2} \Rightarrow \theta^M = \frac{\widehat{\theta}}{\sqrt{\alpha}} = \frac{2}{X}\sqrt{\frac{m}{2\alpha}L} > \frac{2}{X}\sqrt{\frac{m+4}{2}L} = \theta^E$, once $\alpha < \frac{1}{2}\alpha[m]$

$\boxed{6}$

As the previous cases, we first define the entrepreneur's policy, which is the same as (A2.2).

In order to define the lender's monitoring policy, we make use of the expression (11) and (A4.1), to obtain:

$$\frac{\partial}{\partial y_1}U_1^{LB} = \begin{cases} y[\frac{2}{l}\alpha\mu(1-\mu)\theta^2X^2 - m] & If \;\; y \leq \frac{l}{\mu\theta X} \\ \alpha(1-\mu)\theta X - my & If \; y > \frac{l}{\mu\theta X} \end{cases} \quad (A6.1)$$ [25]

We are going to build up the θ-threshold-values, considering three regions of analysis depending on the value of L [26]:

1/ $\boxed{L < \frac{m}{2\alpha}} \Rightarrow \frac{l}{\mu X} < \frac{\widehat{\theta}}{\sqrt{\alpha}} < \sqrt{\frac{2}{\alpha}}\widehat{\theta} < \frac{m}{\alpha(1-\mu)X}$

In this case the optimal policy followed by each agent is:

$$y = \begin{cases} \frac{l}{\mu\theta X} & If \;\; \frac{\widehat{\theta}}{\sqrt{\alpha}} \leq \theta \leq \sqrt{\frac{2}{\alpha}}\widehat{\theta} \\ \frac{\alpha(1-\mu)\theta X}{m} & If \;\; \sqrt{\frac{2}{\alpha}}\widehat{\theta} < \theta \leq \frac{m}{\alpha(1-\mu)X} \\ 1 & If \;\; \frac{m}{\alpha(1-\mu)X} < \theta \end{cases} \qquad h = 1 \;\; If \;\; \theta > \frac{\widehat{\theta}}{\sqrt{\alpha}} \quad (A6.2)$$

Using this policy and the definition of U^{LB}, we can compute the threshold θ^S. To do so, we split the analysis in three cases:

1.1/ $\alpha \geq \alpha[m] \equiv \frac{2m}{m+4}$:

In this case $U^{LB}[\theta = \frac{m}{\alpha(1-\mu)X}] = m(\frac{1}{\alpha} - \frac{1}{2}) - 2 \leq 0$. Therefore we can ensure $\theta^S \geq \frac{m}{\alpha(1-\mu)X} \Rightarrow U^{LB}[\theta^S] = 0$ leads to $\theta^S = \frac{m+4}{2(1-\mu)X}$

1.2/ $\frac{\alpha[m]}{2} \leq \alpha < \alpha[m]$

From 1.1/ we know that $\theta^S < \frac{m}{\alpha(1-\mu)X}$, therefore, the next θ-value to consider has to be $\theta^S = \sqrt{\frac{2}{\alpha}}\widehat{\theta}$.

$U^{LB}[\theta^S = \sqrt{\frac{2}{\alpha}}\widehat{\theta}] \lesseqgtr 0 \;\; If \;\; L \lesseqgtr \widetilde{l} \equiv \frac{2}{(1-\alpha/2)}$, where $\widetilde{l} \lessgtr \frac{m}{2\alpha}$ for $\alpha \lesseqgtr \underline{\alpha} \equiv \frac{2m}{m+8}$,

with $\frac{\alpha[m]}{2} < \underline{\alpha} < \alpha[m]$. This fact leads to consider two possible situations:

$L < \widetilde{l} \Rightarrow \sqrt{\frac{2}{\alpha}}\widehat{\theta} < \theta^S \leq \frac{m}{\alpha(1-\mu)X} \Rightarrow \theta^S = \frac{m}{X(1-\mu)}\sqrt{\frac{2}{m\alpha(1-\alpha/2)}}$

$\widetilde{l} \leq L < \frac{m}{2\alpha} \Rightarrow \frac{1}{\sqrt{\alpha}}\widehat{\theta} < \theta^S \leq \sqrt{\frac{2}{\alpha}}\widehat{\theta} \Rightarrow \theta^S = \frac{\sqrt{m}}{(1-\mu)X}(\frac{L}{\sqrt{2L-4}})$

1.3/ If $\alpha < \frac{1}{2}\alpha[m]$

In this situation $U[\frac{1}{\sqrt{\alpha}}\widehat{\theta}] > 0 \Rightarrow \theta^S = \frac{1}{\sqrt{\alpha}}\widehat{\theta}$ (note that $y = h = 0\ if\ \theta < \frac{1}{\sqrt{\alpha}}\widehat{\theta}$)

The next framework to analyze is:

2/ $\boxed{\frac{m}{2\alpha} \leq L \leq \frac{m}{\alpha}} \Rightarrow \frac{\widehat{\theta}}{\sqrt{\alpha}} \leq \frac{l}{\mu X} < \sqrt{\frac{2}{\alpha}}\widehat{\theta} \leq \frac{m}{\alpha(1-\mu)X}$

In this case the optimal policy followed by each agent is:

$$y = \begin{cases} 1 & If\ \ \frac{\widehat{\theta}}{\sqrt{\alpha}} \leq \theta \leq \frac{l}{\mu X} \\ \frac{l}{\mu \theta X} & If\ \ \frac{l}{\mu X} < \theta \leq \sqrt{\frac{2}{\alpha}}\widehat{\theta} \\ (A5.2) & If\ \ \sqrt{\frac{2}{\alpha}}\widehat{\theta} < \theta \end{cases} \qquad h = \begin{cases} \frac{\mu\theta X}{l} & If\ \ \frac{\widehat{\theta}}{\sqrt{\alpha}} < \theta < \frac{l}{\mu X} \\ 1 & If\ \ \frac{l}{\mu X} < \theta \end{cases} \qquad (A6.3)$$

We derive θ^S, using a similar analysis to the $L < \frac{m}{2\alpha}$ situation. We again distinguish three regions according to the value of α:

2.1/ $\alpha \geq \alpha[m]$

By the same argument of 1.1/, we have that $U^{LB}[\theta = \frac{m}{\alpha(1-\mu)X}] \leq 0$, which implies that $\theta^S = \frac{m+4}{2X(1-\mu)}$

2.2/ $\frac{\alpha[m]}{2} \leq \alpha < \alpha[m]$

We know that $\theta^S < \frac{m}{\alpha(1-\mu)X}$. Following a similar analysis to 1.2/, we have shown for $L \leq \widetilde{l}$ [27] $\Rightarrow \theta^S \geq \sqrt{\frac{2}{\alpha}}\widehat{\theta} \Rightarrow \theta^S = \frac{\sqrt{m}}{X(1-\mu)}\sqrt{\frac{2}{\alpha(1-\alpha/2)}}$.

Regarding to $L > \widetilde{l}$, as $\frac{\widehat{\theta}}{\sqrt{\alpha}} \leq \frac{l}{\mu X}$ differently to 1.2/, we have to compute $U^{LB}[\theta = \frac{l}{\mu X}]{\lesseqgtr}0\ \ if\ L{\lesseqgtr}L[m] \equiv \frac{m+4}{2}$.

Taking into account that $\widetilde{l} < L[m] < \frac{m}{\alpha}$ for $\frac{1}{2}\alpha[m] \leq \alpha < \alpha[m]$:

$\widetilde{l} < L \leq L[m] \Rightarrow \frac{l}{\mu X} \leq \theta^S < \sqrt{\frac{2}{\alpha}}\widehat{\theta} \Rightarrow \theta^S = \frac{\sqrt{m}}{(1-\mu)X}(\frac{L}{\sqrt{2L-4}})$

$L[m] < L < \frac{m}{\alpha} \Rightarrow \frac{1}{\sqrt{\alpha}}\widehat{\theta} < \theta^S < \frac{l}{\mu X} \Rightarrow U^{LB}[\theta^S] = 0$ leads to $\theta^S = \frac{1}{(1-\mu)X}\sqrt{\frac{m+4}{2}L}$

2.3/ If $\alpha < \frac{1}{2}\alpha[m]$

This situation is identical to 1.3/, therefore $\theta^S = \frac{1}{\sqrt{\alpha}}\widehat{\theta}$

The last step is to check for high values of L , in particular:

3/ $\boxed{\frac{m}{\alpha} < L} \Rightarrow \sqrt{\frac{2}{\alpha}}\widehat{\theta} < \frac{l}{\mu X}$ This analysis, as $\frac{\widehat{\theta}}{\sqrt{\alpha}} < \frac{l}{\mu X}$ is the easiest, due to the simplicity of agents' optimal policies:

$$y = \begin{cases} 0 & If\ \ \theta < \frac{\widehat{\theta}}{\sqrt{\alpha}} \\ 1 & If\ \ \frac{\widehat{\theta}}{\sqrt{\alpha}} \leq \theta \end{cases} \qquad h = \begin{cases} 0 & If\ \ \theta < \frac{\widehat{\theta}}{\sqrt{\alpha}} \\ \frac{\mu\theta X}{l} & If\ \ \frac{\widehat{\theta}}{\sqrt{\alpha}} \leq \theta \leq \frac{l}{\mu X} \\ 1 & If\ \ \frac{l}{\mu X} < \theta \end{cases} \qquad (A6.4)$$

Again we distinguish three cases, according to the values of α :

3.1/ $\alpha \geq \alpha[m] \Rightarrow \frac{m}{\alpha} \leq L[m] \leq \tilde{l}$

Expression (A6.4) and the fact that $U^{LB}[\theta = \frac{l}{\mu X}] \lesseqgtr 0$ if $L \lesseqgtr L[m]$; leads to distinguish two cases:

$\frac{m}{\alpha} < L \leq L[m] \Rightarrow \theta^S \geq \frac{l}{\mu X}$ and $U^{LB}[\theta^S] = 0$ leads to $\theta^S = \frac{m+4}{2X(1-\mu)}$

$L[m] < L \Rightarrow \frac{\widehat{\theta}}{\sqrt{\alpha}} \leq \theta^S < \frac{l}{\mu X}$ and $\theta^S = \frac{1}{(1-\mu)X}\sqrt{\frac{m+4}{2}L}$

3.2/ $\frac{\alpha[m]}{2} \leq \alpha < \alpha[m]$

As we have mentioned in 2.2/ $L[m] < \frac{m}{\alpha}$, therefore $L > L[m]$, and $U^{LB}[\frac{l}{\mu X}] > 0$ implies that $\frac{1}{\sqrt{\alpha}}\widehat{\theta} \leq \theta^S \leq \frac{l}{\mu X} \Rightarrow \theta^S = \frac{1}{(1-\mu)X}\sqrt{\frac{m+4}{2}L}$

3.3/ $\alpha < \frac{1}{2}\alpha[m]$

The analysis is the same as 1.3/ and 2.3/ , concluding that $\theta^S = \frac{\widehat{\theta}}{\sqrt{\alpha}}$

To summarize, we have obtained for $\alpha \geq \frac{1}{2}\alpha[m]$ the same results as for the *MBC*, that is, expressions (A4.8) and (A4.9). For $\alpha < \frac{1}{2}\alpha[m]$, differently to the MBC, $\theta^S = \frac{\widehat{\theta}}{\sqrt{\alpha}}$

$\boxed{7}$

To compare θ^S with θ^M when $L < \frac{2}{1-\alpha}$, we have to note that $\frac{d}{dL}\theta^M = 0$ for $L \leq \frac{4}{2-\alpha}$, and $\frac{d}{dL}\theta^M < 0$ for $\frac{4}{2-\alpha} < L < \frac{2}{1-\alpha}$. On the other hand, $\frac{d}{dL}\theta^S > 0$ for $L < \frac{2}{1-\alpha}$. As $\theta^S[\frac{4}{2-\alpha}] = \theta^M[\frac{4}{2-\alpha}] \Rightarrow \theta^S < \theta^M[\frac{4}{2-\alpha}]$ for $L < \frac{2}{1-\alpha}$.

FOOTNOTES

[1] This functional form facilitates the separation of effects: the quality of the agents inside the firm, and the quality of the lender, in the investment policy followed by the lender. Furthermore, we can consider this functional form as a local approximation to more general forms.

[2] This value of $I = 2$ simplifies the quadratic expressions derived from the cost functions.

[3] We assume zero interest rate

[4] The logic under this assumption is that in the initial period, there is an exchange of intangibles (knowledge, know-how) that does not generate material assets that could be liquidated.

[5] This number 4 obtained, is a consequence of assuming $I = 2$ and to deal with quadratic effort cost functions.

[6] When $\mid l - m \mid > 4$, effort cost differences $(\frac{1}{2} \mid l - m \mid)$ become higher than the investments needed to undertake a project. Situation with a low economic interest.

[7] Obviously under this *EBC* scenario we have that $L = l$, as $\mu = \frac{1}{2}$.

[8] This $m-$dependent factor will also be present in the threshold values of the different financial arrangements considered.

[9] In fact, as it was stated in Section 2, the Main Bank lends to the firm the overall amount of funds I, and borrows from the other bank $(1 - \alpha)I$.

[10] MB_i denotes the MB for project **i**, and MB_{-i} is the *MB* for the project which is not i $(i = 1, 2)$. Maintaining the same logic for second banks (SB).

[11] If we consider an additive term to account for spillovers, instead of a multiplicative factor λ, all the arguments made henceforth will work in the same way.

[12] Similarly to the EBC, as $\mu^{MB} = \frac{1}{2}$, we get an expression of $L \equiv l\frac{\mu}{1-\mu}$, which is directly the l parameter that controls workers' quality.

[13] In the case of a perfect monitoring $y = 1$.

[14] Where $\frac{2}{1-\alpha} < \frac{m+4}{2}$ for $\alpha < \frac{\alpha[m]}{2}$.

[15] This effect can be shown from equation (9), if we compute $\frac{d\theta^M}{dL} < 0$ for $\frac{4}{1-\alpha} \leq L < \frac{m+4}{2} \leq 4$; that is, the lower the entrepreneur's quality to be, the lower the underivestement will be.

[16] We can think that monitoring tasks involve two activities: supervision and expertise transfer. If the entrepeneur is of high quality, the lender will reduce

supervision activities, focusing in the transfer of kowledge to the firm. This fact will lead globally to less-than-perfect monitoring actions, $(y < 1)$.

[17] These conditions are established in Points 1 and 2 of Proposition 2

[18] Assuming the liquidation value of the project to be zero, reasonnig in the same way as we did in the model.

[19] In the text is motivated that $\mu^{EB} = \frac{1}{2}$. To facilitate the comparison with the following scenarios, we maintain the general notation $\mu^{EB} \equiv \mu$

[20] Obviusly $L = l$, as we have stated that $\mu^{EB} \equiv \mu = \frac{1}{2}$

[21] As in the *EBC*, within this *MBC* scenario $\mu^{MB} \equiv \mu = \frac{1}{2}$, therefore $L \equiv l\frac{\mu}{1-\mu} = l$

[22] Obviously, this situation can only be possible, when $m \leq 4$

[23] Remember that $m \leq 4$

[24] Where we have used $h = \frac{1}{l}\mu\theta xy < 1$

[25] SOC are satisfied, as $\frac{\partial^2 U_1^{LB}}{\partial y_1^2} = -m < 0$

[26] Under this scenario, we have argued that $\mu^{CB} \equiv \mu = \frac{1}{3} \Rightarrow L \equiv l\frac{\mu}{1-\mu} = \frac{l}{2}$

[27] To be possible that $\widetilde{l} > \frac{m}{2\alpha}$, then $\alpha > \underline{\alpha} \equiv \frac{2m}{m+8}$ is required, with $\frac{1}{2}\alpha[m] < \underline{\alpha} < \alpha[m]$

BIBLIOGRAPHY

Aoki, M. & Sheard, P. (1992), "The Main Bank System and Corporate Governance in Japan" *Unpublished Manuscript Stanford University, 1992.*

Aoki, M. (1994a) , "The Contingent Governance of Teams: Analysis of Institutional Complementarity" *International Economic Review 35, 3; (657-677)*

Aoki, M. ; Sheard, P. & Patrick, H. (1994b) "The Main Bank System, an Economic Overview" *Chapter 1 of "The Japanese Main Bank System". Oxford University Press Inc., New York. Edited by Aoki, M. & Patrick, H.*

Berglöf, E. & Perotti, E.(1994) "The Governance Structure of the Japanese Financial Keiretsu" *Journal of Financial Economics 36; (259-284)*

Cestona, M. A. & Salas, V. (1996) "Efficient Privatization under Incomplete Contracts" *Documents de Treball 96/2. Departamento de Economía de la Empresa UAB*

Hoshi, H (1994) "The Economic Role of Corporate Grouping and the Main Bank System" in *"The Japanese Firm: The Sources of Competitive Strength" M. Aoki & E. Dore eds. Oxford University Press, N.Y.*

Rajan, R. G. (1992) "Insiders and Outsiders: The Choice between Informed and Arm's-Length Debt". *The Journal of Finance 47; (1367-1397).*

Sheard, P. (1989) "The Main Bank and Corporate Monitoring and Control in Japan " . *Journal of Economic Behavior and Organization 11, (399-422)*

Sheard, P. (1994a) "Interlocking Shareholding and Corporate Governance in Japan" *"The Japanese Firm: The Sources of Competitive Strength" M. Aoki & E. Dore eds. Oxford University Press, N.Y.*

Sheard, P. (1994b) "Reciprocal Delegated Monitoring in the Japanese Main Bank System". *Journal of the Japanese and International Economies 8; (1-21)*

Sheard, P. (1994c) "The Main Bank and the management of the financial distress" *Chapter 6 of "The Japanese Main Bank System". Oxford University Press Inc., New York. Edited by Aoki, M. & Patrick, H.*